IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of	)	**MAIL STOP AF**
Paul Joseph Brooks	)	Group Art Unit: 1783
Application No.: 10/584,407	)	Examiner: Prashant J. Khatri
Filed: June 26, 2006	)	Confirmation No.: 9864
For: THERMAL CONTROL FILM FOR SPACECRAFT	)	

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant requests review of the final rejection in the above-identified application. No amendments are filed herewith.

Applicant requests challenges the following:

1. The rejection of claims 1, 4, 6-10, 14-18, 21, and 23 under 35 U.S.C. §112, second paragraph for alleged indefiniteness; and
2. The rejection of claims 1, 4, 6, 9-10, 14, 21, 23, and 24 under 35 U.S.C. §103(a) for alleged unpatentability over *Rogers et al* (U.S. Patent No. 4,479,131) in view of *Jonza et al.* (U.S. Patent No. 5,882,774) with evidence from *3M™ Radiant Mirror Film VM2000F1A6 Product Sheet* ("3M Product Sheet").

The terms "High" and "Low" are definite

U.S. Patent No. 6,587,263 ("the '263 patent), which is discussed in the Background section of Applicant's disclosure, describes an optical solar reflector (OSR) that includes, among other features, a radiative layer 108. The radiative layer 108 is described as being chosen to have "low absorbency or electromagnetic radiation", which "avoids heating the spacecraft due to absorption of this energy" (Emphasis added, col. 4, lines 3-19). The radiative layer 108 also has high absorbency and emissivity in an infrared wavelength range.

Absorbency (α) values in an electromagnetic range of 200 nm to 2500 nm and emissivity (E) values in an infrared range of 2.5 µm to 25 µm were determined through tests (See Table A).

TABLE A

Alpha and emissivity values of PECVD coating on Ag

Coating	Thick (µm)	α	E	α/E
SiO_2	12.8	0.184	0.811	0.226
$SiO_{1.14}N_{0.57}$	16.7	0.073	0.854	0.085
$SiO_{0.8}N_{0.8}$	16.8	0.070	0.857	0.082
$SiO_{0.5}N$	16.5	0.068	—	—
SiO_3N_4	13.6	0.083	0.847	0.098
standard	50	0.075	0.846	0.088

In the final rejection, the Examiner argues that the values for emissivity and absorbency are not applicable to the thermal film recited Applicant's claims because the film described in the '263 patent is of a different material. While Applicant acknowledges that the material disclosed in the '263 patent and the thermal material recited in Applicant's claims are different, this difference is irrelevant to the evidence that the '263 patent provides regarding an exemplary range of values. One of ordinary skill would have understood to quantify "high absorbency", "high emissivity", and "low absorbency" as recited in the claims. The values in TABLE A of the '236 patent are not relied upon to show the exact values that the thermal material embodied in the claims would exhibit. Rather, because the scale for determining absorbency and emissivity would have been known to one of skill in the art, and is standardized for all materials this same person of skill would have been able to ascertain a corresponding high or low value of emissivity and absorbency as claimed and provided in the context of Applicant's disclosure. In other words, despite the type of material used, because the scale used to measure emissivity and absorbency is standardized it follows that the determination of whether a material has high or low emissivity or absorbency is not

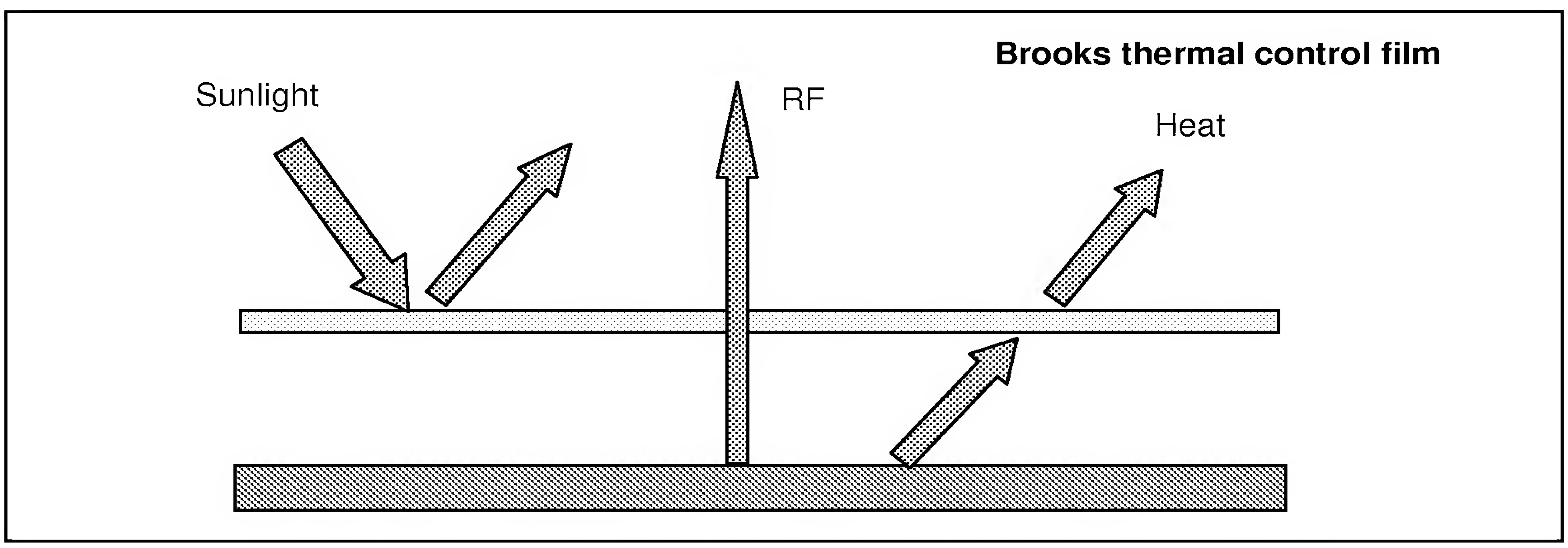
based upon a reference value for the respective material but rather upon the values of a respective material with regard to the standardized scale.

For these reasons, Applicant believes that the terms "high" and "low" as recited in Applicant's claims are clear, precise, and otherwise definite.

Independent claims 1, 23, and 24 are distinguishable over the art combination

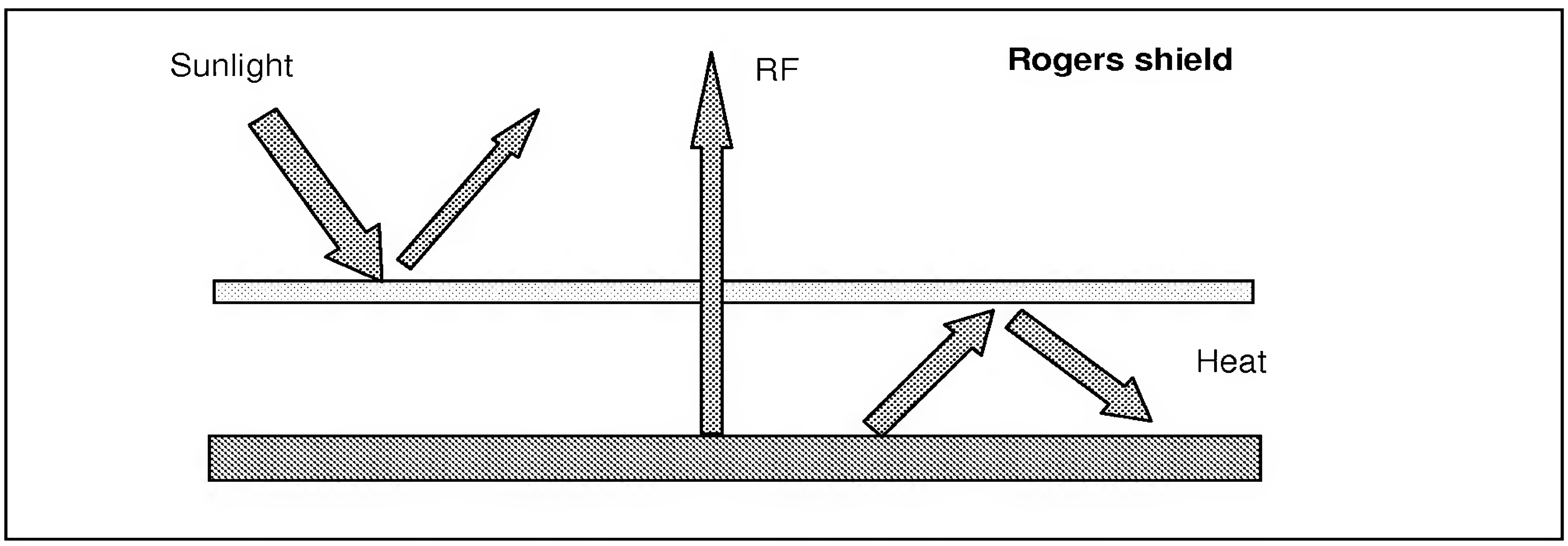
Applicant maintains that the prior art combination, and particularly, *Rogers* fails to disclose or suggest an antenna having an active face, and a thermal film being provided on the active face, as recited in Applicant's claim 1.

The embodiments as recited in Applicant's independent claims are directed to an active antenna system that generates and transmits the spacecraft RF signal. An "active" antenna system is one that consumes electrical power to create, process, and transmit the RF signal.



An active antenna generates a significant amount of waste heat as part of the generation of the RF signal and must be efficiently radiated away from the antenna into space without overheating the active antenna. Through the combination of features recited therein, the claimed embodiments, reflect away sunlight, to allow transmission of the RF signal and the transmission of heat generated in the antenna. Interference filter technology is used to produce a reflectivity of at least 80%, which leads to a lower absorbed solar heat load and therefore a greater ability to deal with the heat generated in the active antenna.

Rogers discloses a thermal shield positioned in front of an antenna reflector. The shield comprises a semiconductor optical coating and a capacitive grid on a substrate. The shield is provided on a passive reflector to focus signals onto a receiver (col. 2, lines 6-11; Fig. 1). The optical coating is designed such that not all solar energy will be absorbed by the coating on the sun side of the shield and to prevent heating of the shield. The optical coating also provides for the shield radiating heat, resulting from the absorbed solar energy, back into space (col. 2, lines 60-68). The combination of a capacitive aluminum grid and the optical coating/film provide the desired emissive characteristics, as the optical coating is provided to reduce solar transmittance and the capacitive grid stops the solar radiation (col. 4, lines 18 to 23).



One of skill in the art would have understood that Rogers discloses the use of an RF transparent thermal blanket for an antenna <u>reflector</u> that passively reflects RF energy generated elsewhere in the spacecraft. This thermal blanket impedes heat flow and therefore does not allow the waste heat to be dumped to space without a large rise in temperature. As a result, the temperature of the antenna would be too high and the system would be unviable.

Jonza discloses an optical film having a multilayered polymeric sheet with alternating layers of polyethylene naphthalate and a polymer that is a reflective polarizer or mirror. The multilayer construction as shown in Fig. 1b includes alternate low and high index thick films having no tuned wavelengths or bandwidth constraints. The preferred multilayer stack

ensures that wavelengths that would be most strongly absorbed by the stack are the first wavelengths that would be most strongly absorbed by the stack.

However, neither *Jonza* nor the *3M Product Sheet* provides motivation to modify a film such that it can be provided on an active face in order to let RF signals out, along with the waste heat, while also minimizing the heat generated by incident radiation from the sun. Moreover, these documents would not have guided one of skill in the art with regard to modifying the shield of *Rogers* into a film that can be used on an active face. The skilled artisan would not have looked to modify the shield of *Rogers* to emit IR radiation as recited in Applicant's claims because the shield is provided on a passive reflector and would not be required to emit heat generated by active components within the antenna.

For at least these reasons, the combination of *Rogers*, *Jonza*, and the *3M Product Sheet* do not establish a *prima facie* case of obviousness and withdrawal of the final rejection is deemed to be in order.

Respectfully submitted,

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